EFFECT OF YOGA PRACTICE DURING OFFSEASON SUPER COMPENSATION, PHYSICAL FITNESS AND SKILLS PERFORMANCE OF ELITE VOLLEYBALL PLAYERS

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1.0 INTRODUCTION

The modern volleyball is highly specialized in almost all the major skills of volleyball. The game of volleyball has been invented in the year 1895 by William G. Morgan Halyoke, Massachusetts as a recreational activity for the businessmen. It is a sport for young and old for men and women. Volleyball is a sport and by nature this game is enjoyable, challenging and absorbing, andrequires a certain amount of skills and mento-physical condition. Players of any game including volleyball having superior performance are selected on the basis of fitness, skill, physical structure, body size etc., which has proved to be appropriate for high performance in the given sports.

Volleyball game is characterized by intermittent short bouts of explosive activity including jumps, dives, sprints, spikes, and multi-directional court movements (Black, 1995). Additionally, the players need to develop technical and tactical skills along with muscular strength and power for successful performance (Cardoso Marques, Gonzalez-Badillo &Kluka, 2006). Therefore, coaches and trainers are constantly looking for effective training regimens to improve muscular strength and power output amongst volleyball athletes.

In every sport there is a transition period wherein athlete is transitioning from the previous season towards the next one. Most athletes try to take anything from few weeks to few months off before starting to prepare for the next season. Taking time off doesn’t necessary mean athletes won't do anything. Athletes could just rest – but most often we can’t sit even one week without doing any exercises.Transition period is the time when athletes could stay away from the sports specific training – and do sports that they can’t be doing on the season. The main idea behind off season period training is to relax and have fun so that the athlete’s body and mind is refreshed for the next season.If the player is badly “out of shape” and gets tired easily –off season period is a good time to put extra attention to endurance training. In

fact, this is the time for volleyball players to focus on increasing a vertical jump, improve explosiveness, training muscles and recovering from injuries.

Professional volleyball is becoming more and more demanding from a physical and technical point-of-view. Thus, training programs need to be monitored and corrected on a weekly basis throughout the year, depending on the team's practice and game schedule.One of the most challenging problems for coaches is peaking athletic shape and maximizing performance at a given time, i.e. usually the main competition of the year. Often athletes peak before the main competition.

Although, various conditioning training programs have been evolved to maintain physical fitness and skills in volleyball players. However, Indian Traditional yoga practices have not been explored extensively in sport like volleyball. In fact, previous research studies show that yoga practices are effective in improving physical fitness and skills in varied population (Youkhana, Dean, Wolff, Sherrington &Tiedemann, 2016; Kongkaew*et al*., 2018; Mohanty, Murty, Pradhan & Hankey, 2015; Papp *et al*., 2016; Gothe& McAuley, 2016; Sovova*et al*., 2015; Bussing *et al*., 2012; Akila, 2016). Therefore, researcher intends to develop a yoga training program which could be effective in reducing super compensation level and in improving physical fitness and skills of volleyball players exclusively during the off-season training programme.

1.1 Statement of Problem

Volleyball is an intermittent high intensity team sport, where a combination of physical characteristics and aerobic and anaerobic capacity is necessary in order to perform a sequence of well-coordinated high demand activities (Gabbett&Georgieff, 2007). The top performance of volleyball players is influenced by many factors such as physical, physiological and psychological variables, technique, tactics, physique, body size, body

composition, application of biomechanical principles etc. It has also been well established that special physical characteristics indicate whether the player would be suitable for the competition at the highest level in a specific sport (Slater *et al*., 2005). No doubt the performance of player influenced by many factors but still physical fitness components of a specific game is the primary factor among those entire factors (Lidor&Ziv, 2010). In fact, players need to maintain physical fitness throughout the year to meet the competitive demands. It is very difficult for players to maintain physical fitness and skill level during off season,as players are free of games and competitions.

Once the competitive season is over, players need physical and mental rest. Further, the most important part of off season is to recover. Without proper rest there can be negative consequences. One major consequence is injury. The body needs time to heal and any player, elite or professional, who pushed too hard throughout the year will almost certainly see physical harm. If athletes evade physical injury by some small chance, they still have to deal with mental stress. Athletes are constantly developing their skills, and they return back to the basics during the off-season;it's important to develop better, stronger foundations and systems. Developing specific training programmeduring the off-season not only promotes recovery, it gives athletes a competitive edge. Thus, off-season training is significant because the players can recover the state of super compensation and maintain their fitness and skill abilities so that they can get ready to participate in the forthcoming pre-season and competition season respectively.

No matter the sport, during competitive season, athletes place unequal pressures on parts of their body;these imbalances can be dangerous if left unchecked; therefore, offseason training helps to not only correct the imbalances, but prevents injury and its early recovery by improving an athlete's health and fitness. Therefore, the present investigator thought of introducing a specialized yoga program during offseason for elite volleyball players to record its impact on super compensation, physical fitness and

skills. Most importantly, there are very few studies in this direction available so far; hence, development and implementation of yoga program for elite volleyball players seems to be logical especially during offseason of both micro and macro cycles of sport training.

1.2 Problem and its Relevance

Volleyball is a fast, high-level competitive team sport, demanding power and agility. Strength, particularly reactive strength and explosive power, are the components of physical fitness that are not only crucial to players in terms of game performance, but also in terms of health and injury prevention (Cheung, Smith & Wong, 2012; Soundara&Pushparajan, 2010; Stastny, Tufano, Golas& Petr, 2016). In addition, during competition volleyball players are involved in frequent short bouts of high-intensity exercise, followed by periods of low-intensity activity (Kunstlinger*et al*., 1987; Polglaze& Dawson 1992; Viitasalo*et al*., 1987). The high-intensity bouts of exercise, coupled with the total duration of the match (~90 minutes), requires players to have well-developed aerobic and anaerobic alactic (ATP-CP) energy systems (Hakkinen, 1993). Considerable demands are also placed on the neuromuscular system during the various sprints, jumps (blocking and spiking), and high-intensity court movement that occurs repeatedly during competition. As a result, volleyball players require well-developed speed, agility, upper body and lower body muscle power, and maximal aerobic power (VO2max). Several studies have documented the physiological and anthropometric characteristics of senior volleyball players (Fleck *et al*., 1985; Hasceli*et al*., 1989; Spence *et al*., 1980), with the fitness of players typically increasing as the playing level is increased (Smith *et al*., 1992; Thissen-Milder & Mayhew 1991). Further, strength, speed, and power are dominant in spiking and blocking actions, and in most cases, winning points depend on them (Dopsai, Copic, Nesic&Sikimic, 2012). It has been shown that changes in physical performance occur after an in-season training regimen in professional volleyball players (Marques, Tillaar, Vescovi& Gonzalez-Badillo,

2008), but the changes in super compensation, physical fitness and skills during off season have yet to be investigated.

For the reasons mentioned above, an important aim of the training process during short term training (Micro) and an annual training (Macro) cycle is to increase or to maintain physical fitness and skills at a consistent level during the off season. In this context yoga may appear to be better training regimen as earlier investigations demonstrated that yoga practices could improve physical fitness (Bedekar&Hande, 2017; Ray *et al*., 2001; Tran, Holly, Lashbrook& Amsterdam, 2001; Sovova*et al*., 2015; Lau, Yu & Woo, 2015; Kongkaew*et al*., 2018; Satish *et al*, 2018). Therefore, researcher has planned to undertake this study entitled "**Effect of yoga on offseason super compensation, physical fitness and skills of elite volleyball players**."

1.3 Objectives of the Study

In the light of the above statement, the following are the objectives of the study:

- To measure the offseason status of super compensation, physical fitness and skills of elite volleyball playersduringmicro cycle and macro cycle of training.
- To prepare and develop yoga training programmeexclusively for elite volleyball players with a view to maintain physical fitness and skills during off season.
- To evaluate the efficacy of yoga training programme on super compensation, physical fitness and skills of the volleyball players.

1.4 Hypotheses

Since there is limited research on yoga in relation to volleyball especially its impact during off season of sport training, the researcher hypothesized that-

HO_1: The yoga training programme will show a significant improvement in agility of elite volleyball players during super compensation during off season of micro and macro cycles.

HO_2: The yoga training programme will show a significant improvement in flexibility of elite volleyball players during super compensation during off season of micro and macro cycles.

HO_3: The yoga training programme will show a significant improvement in strength and power of elite volleyball players during super compensation during off season of micro and macro cycles.

HO_4 The yoga training programme will show a significant improvement in speed of elite volleyball players during super compensation during off season of micro and macro cycles.

$HO_{6:}$ The yoga training programme will show a significant improvement in body fat of elite volleyball players during super compensation during off season of micro and macro cycles.

$HO_{7:}$ The yoga training programme will show a significant improvement in overhead pass skill of elite volleyball players during super compensation during off season of micro and macro cycles.

$HO_{8:}$ The yoga training programme will show a significant improvement in forearm pass of elite volleyball players during super compensation during off season of micro and macro cycles.

$HO_{9:}$ The yoga training programme will show a significant improvement in service receive skill of elite volleyball players during super compensation during off season of micro and macro cycles

$HO_{9:}$ The yoga training programme will show a significant improvement in spiking and blocking skill of elite volleyball players during super compensation during off season of micro and macro cycles

1.5 Delimitation of the Study

This study will be delimited as follows:

- This study will be delimited to the school going male volleyball-players age ranged from 14-16 years.

- Although there are several factors involved for enhancement of volleyball performance, the present study will be delimited to super compensation level, certain physical fitness parameters and some technical skills required for the volleyball players.

1.6 Limitations of the Study

- Due to time limitation and busy schedule in school, the investigator will not be able to restrict the Yoga training session for more than one hour daily.
- Total duration of experiment for this study may not be increased more than six weeks.

1.7 Significance of the Study

- The study may bring an outstanding result showing improvement in the performance in volleyball, which is a challenging fastest sport.

- Basketball players at national and international level may be benefited through this study.

- The newly designed yoga program may be included during off season in Indian volleyball players for maintaining physical fitness and skills.

1.8 Operational Definitions of Important Terms Used

Yoga practices

Yoga is an Indian philosophy, which has been proved as a scientific discipline for enriching state of self realization in bringing psycho-physical homeostasis. However, yoga practice is a system of systematic practice of different kinds of posture (Asanas), breathing (Pranayams) and meditation (Dhyana) which primarily aims at providing health and physical fitness at psycho-physiological level.

Super compensation

In sports science theory, supercompensation is the post training period during which the trained function/parameter has a higher performance capacity than it did prior to the training period.

Physical Fitness

1. Fitness is a state, which characterizes the degree to which a person is able to function without undue fatigue. It is the capacity to work that depends upon the physical, mental, emotional, social and spiritual components of fitness all of which are related to each other.

2. Physical fitness is the ability to carry out daily tasks with vigour and alertness without for undue fatigue and meet with the ample energy to engage in leisure time pursuit and to meet the above physical stress encountered in emergency situation.

3. Physical fitness is defined as the ability to perform muscular work satisfactorily under specified conditions and may be assessed.

4. Physical fitness is an intrinsically individualized under expressing individuals biodynamic potentials, comprising functional and metabolic components. It brings in functional integration of parts of

body at the highest levels of work efficiency, energy economy and endurance

Skills

An ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities.

2.0 BRIEF OF REVIEW OF LITERATURE

A sincere and exhaustive attempt has been made by the researcher to locate the relevant and useful studies. The findings and conclusion of these studies have been carefully extracted and cited below.

Malousaros*et al*., (2008) described the morphological characteristics of competitive female volleyball players. For this purpose, body weight and height, breadths and girths as well as skin fold thickness at various body sites were assessed in 163 elite female volleyball players (age : 23.8+4.7 years, years of playing : 11.5+4.2, hours of training per week : 11.9+2.9, means+ S.D.) . Seventy – nine of these players were from the A1 division and the rest form the A2 division of the Greek National League. Two – way ANOVA was used to compare the differences in these characteristics between competition level and playing position. Body height ranged from 161cm to 194cm, and the mean value (177.1+6.5cm) was not inferior to that of international players of similar caliber. Adiposity of these players (sum of 5 skin folds: 51.8+10.2mm, percent body fat: 23.4+2.8) was higher than that reported in other studies in which, however, different methodology was used. Volleyball athletes of this study were mainly balanced endomorphs (3.4-2.7-2.9). The A1 division players were taller and slightly leaner with greater fat-free mass than their A2 counterparts. Significant differences were found among athletes of different playing positions which are interpreted by their varying roles and physical demands during a volleyball game. The volleyball players who play as opposites were the only subgroup of players differing between divisions; the A2 opposites had more body fat than A1 opposites. These data could be

added in the international literature related to the anthropometric characteristics of competitive female volleyball players.

Bandopadhyay (2007)selected 50 sedentary males and 128 sports persons (volleyball =82, soccer =46) of 20-24 years from West Bengal, India, to evaluate and compare their anthropometry and body composition. Skin folds, girth measurements, body fat percentage (%fat), and endomorph were significantly higher among sedentary individuals, but lean body mass (LBM) and mesomorphy were significantly ($p<0.001$) higher among the sports persons. Soccer and volleyball players were found to be ectomorphic mesomorph, whereas sedentary subjects were endomorphic mesomorph. The soccer and volleyball players had higher % fat with lower body height and body mass than their overseas counterpart's % fat exhibited a significant correlation with body mass index (BMI) and thus prediction equations for % fat from BMI were computed in each group. The present data will serve as a reference standard for the anthropometry and body composition of Indian soccer and volleyball players and the prediction norms for % fat will help to provide a first-hand impression of body composition in the studied population.

Volleyball has been described as an 'interval' sport with both anaerobic and aerobic components. At the higher skill levels, technical performance may be limited by physical characteristics as well as physical fitness, and performance characteristics such as speed and vertical jump. Hence, Smith, Roberts and Watson (1992)compared teams at the two uppermost levels of men's volleyball in Canada for differences in physical physiological and performance characteristics. The subjects were members of the national (n=15) and Universidad teams (n= 24). The parameters examined included percent body fat maximal oxygen uptake (VO2 max) anaerobic power bench 20-m sprint time and vertical jumping ability. The only significant difference in physical characteristics between the two teams was in age. Despite similarities in standing and rich height the national team players had significantly higher block (3.27 vs. 3.21 m) and spike (3.43 vs. 3.39 m) jumps. An evaluation of anaerobic power measures produced similar power outputs

during a modified Wingate test yet the national team members had higher scores (P less than 0.05) for spike and block jump differences as well as 20-m sprint time. The large aerobic component of elite volleyball play was supported by the high VO2 max value recorded for the national team players (56.7 vs. 50.3 ml kg-1 min -1). The results suggest that either years of specific physical conditioning and playing or the selection of individuals for the national team who possess more desirable characteristics as a consequence of genetic endowment, plays a significant role in the preparation of genetic endowment, plays a significant role in the preparation of international caliber volleyball players.

Gaebbett*et al*., (2006)investigated the effect of a skill-based training program on measurements of skill and physical fitness in talent-identified volleyball players. Twenty-six talented junior volleyball players (mean+/- SE age, 15.5 +/- 0.2 years) participated in an 8-week skill-based training program that included 3 skill-based court sessions per week. Skills sessions were designed to develop passing, setting, serving, spiking and blocking technique and accuracy as well as game tactics and instructional coaching, coupled with skill-based games to facilitate learning. Subjects performed measurements of skill (passing, setting, serving, and spiking technique and accuracy), standard anthropometry (height , standing- reach height, body mass, and sum of 7 skin folds), lower-body muscular power (vertical jump, spike jump), upper-body muscular power (overhead medicine –ball throw), speed (5-and 10-m sprint), agility (T-test), and maximal aerobic power (multistage fitness test) before and after training. Training induced significant ($p< 0.05$) improvements in spiking, setting, and passing accuracy and spiking and passing technique. Compared with prêt raining, there were significant ($p<0.05$) improvements in 5-and 10-m speed and agility. There were no significant differences between prê-training and post training for body mass, skin fold thickness lower-body muscular power, upper-body muscular power, and maximal aerobic power. These findings demonstrate that skill-based volleyball training improves spiking, setting and passing accuracy and spiking and passing technique, but

has little effect on the physiological and anthropometric characteristics of players.

It is often recommended that in-season training programs aim to maintain muscular strength and power developed during the off-season. However, improvements in performance may be possible with a well-designed training regimen. Therefore, Marques *et al*., (2008)conducted a study with the purpose to describe the changes in physical performance after an in-season training regimen in professional female volleyball players in order to determine whether muscular strength and power might be improved. Apart from normal practice sessions, 10 elite female volleyball players completed 2 training sessions per week, which included both resistance training and polymeric exercises. Over the 12- week season, the athletes performed 3-4 sets of 3-8 repetitions for resistance and polymeric exercises during each training session. All sessions were supervised by one of the investigators as well as by the team head coach. Muscular strength and power were assessed before and after the 12- week training program using 4 repetition maximum bench press and parallel squat tests, an overhead medicine ball throw (BTd), as well as unloaded and loaded countermovement jumps (CMJs). Strength improved by 15% and 11.5% in the bench press and parallel squat, respectively ($p<0.0001$). Distance in the BTd improved by 11.8% ($p<0.0001$), whereas unloaded and loaded CMJ height increased between 3.8 and 11.2%. the current findings suggest that elite female volleyball players can improve strength and power during the completion season by implementing a well-designed training program that includes both resistance and polymeric exercises.

Sheppard *et al*., (2008) examined the potential strength, power, and anthropometric contributors to vertical jump performance that are considered specific to volleyball success: the spike jump (SPJ) that are countermovement vertical jump (CMVJ). To assess the relationship among strength, power, anthropometric variables with CMVJ and SPJ, a correlation and regression

analysis was performed. In addition a comparison of strength, power, and anthropometric differences between the seven best subjected and seven worst athletes on the CMVJ test and SPJ test was performed. When expressed as body mass relative measures, moderator correlations (0.53-0.65; p < or = 0.01) were observed between the 1RM measures and both relative CMVJ and relative SPJ. Very strong correlation were observed between relative (absolute height-standing reach height) depth jump performance and relative SPJ (0.85; p < or = 0.01) and relative CMVJ (0.93; p < = 0.01). The single best regression model component for relative CMVJ was the relative depth performance, explaining 84% of performance. The single best predictor for relative SPJ was also the relative depth jump performance (72% of performance), with the three-component models of relative depth jump, relative CMVJ, spike jump contribution (percent difference between SPJ and CMVJ), and relative CMVJ, spike jump contribution and peak force accounting for 96% and 97% respectively. The result of this study clearly demonstrated that in an elite population of volleyball player's stretch-shortening cycle performance and ability to tolerate high stretch loads as in the depth jump is critical to performance in the jumps associated with volleyball performance.

Kioumourtzoglou*et al*., (2000)examined the cognitive, motor and perceptual abilities of elite volleyball players. These abilities were considered responsible for high quality performance by expert athletes. The elite group was formed with 12 member of the Geek Junior National Volleyball team. A group of 18 physical education students were the novice athletes. The measured abilities were selected by expert volleyball coaches as those most important for an elite athlete. Analysis showed differences between the abilities of the two groups of athletes were significant. An ability profile for the elite volleyball player can be formed.

The summary of literature presented above indicates the availability of ample of researches on the effect of various exercise training programmes on

physical, anthropological and physiological attributes of health and fitness. Many studies related to morphological and fitness variables of volleyball players are also available in the literature. However, the research evidence towards development of standard “yoga training programme” and its usefulness in maintaining off season physical fitness and skills in elite volleyball players is so far meager. Therefore, this piece of research seems to be logical and justified.

3.0 METHODOLOGY

In this piece of research, two separate experiments have been planned exclusively during offseason of sports training –

1) Experiment on offseason in micro cycle (duration: 45 days), and

2) Experiment onoffseason in macro cycle (duration: 90 days).

3.1 Experimental Design in Off-season phase on Micro cycle:

The subjects and sampling

Thirty male elite volleyball players (n=30), aged 14 to 16 years, will volunteer for this controlled experiment. The subjects, whoare participating in **micro cycle** of volleyball training, will be located from local schools by employing Fishers random table sampling technique. Making the use of the table random numbers, all the 30 subjects will be divided randomly into two matched groups so that each group will represent 15 players of volleyball.

Method of experiment

This experiment will be conducted during *transitional phase* (off-season) last 45 days of **Micro cycle** of training. The two groups – one

experimental group (n1=15) and one control group (n2=15) will be participating in this experiment.

Three major variables (viz., *super compensation, physical fitness and volleyball skills*) will be**pre- tested**on all the subjects of the experimental and control groups. The data being collected here will be treated as baseline (pre-test) data for this experiment.

A specialized yoga schedule for 45 days will be developed exclusively for the volleyball players considering the nature of offseason activities. The experimental group will participate in the conventional*lead-up practice* of *volleyball skills* for 1 hr. (4:15 p.m. -5:15 p.m.) and additionally participate in the new developed *yoga schedule* for 1 hr. (5:15 p.m. -6:15 p.m.) for a total period of 45 days of offseason except Sundays and holidays.

However, the control group will participate in the said lead-up practice of volleyball skills for 1 hr. (4:15 p.m. -5:15 p.m.) and additionally participate, in some recreation activities for 1 hr. (5:15 p.m. -6:15 p.m.) for a total period of 45 days of offseason except Sundays and holidays. It should be noted that the controlled group should not participate in the yoga programme.

After the off-season training for **micro cycle** period is over, both the groups (Exp. & Control) will be post tested with the same three variables (viz., *super compensation, physical fitness and volleyball skills*) like pre-test.

The schematic research design, in short, is presented in Table 1.

Table 1
Schematic representation of the design of the Offseason Experiment on Volleyball players (Micro cycle)

Off season experiment on Micro cycle		
Baseline	**Training** (Transitional / Offseason)	**Post test**

Day 1	45 days	Day 1
Super compensation	**Exp. Gr.** (n1=15)**:** Lead up practice of Volleyball skills + Yoga.	Super compensation
Physical fitness		Physical fitness
Volleyball skills	**Cont. Gr.** (n2=15)**:** Lead up practice of Volleyball skills + Recreation.	Volleyball skills

3.2 Experimental Design in Off-season phase on Macro cycle**:**

The subjects and sampling

Thirty male elite volleyball players (n=30), aged 14 to 16 years, will volunteer for this controlled experiment. The subjects, who are participating in **macro cycle** of volleyball training, will be located from local schools by employing Fishers random table sampling technique. Making the use of the table random numbers, all the 30 subjects will be divided randomly into two matched groups so that each group will represent 15 players of volleyball.

Method of experiment

This experiment will be conducted during *transitional phase* (off-season) last 45 days of **Macro cycle** of training. The two groups – one experimental group (n1=15) and one control group (n2=15) will be participating in this experiment.

Three major variables (viz., *super compensation, physical fitness and volleyball skills*) will be **pre- tested** on all the subjects of the experimental and control groups. The data being collected here will be treated as baseline (pre-test) data for this experiment.

A specialized yoga schedule for 45 days will be developed exclusively for the volleyball players considering the nature of offseason activities. The experimental group will participate in the conventional *lead-up practice* of

volleyball skills for 1 hr. (4:15 p.m. -5:15 p.m.) and additionally participate in the new developed *yoga schedule* for 1 hr. (5:15 p.m. -6:15 p.m.) for a total period of 45 days of offseason except Sundays and holidays.

However, the control group will participate in the said lead-up practice of volleyball skills for 1 hr. (4:15 p.m. -5:15 p.m.) and additionally participate, in some recreation activities for 1 hr. (5:15 p.m. -6:15 p.m.) for a total period of 45 days of offseason except Sundays and holidays. It should be noted that the controlled group should not participate in the yoga programme.

After the off-season training for **macro cycle** period is over, both the groups (Exp. & Control) will be post tested with the same three variables (viz., *super compensation, physical fitness and volleyball skills*) like pre-test.

The schematic research design, in short, is presented in Table 2.

Table 2
Schematic representation of the design of the Offseason Experiment on Volleyball players (Macro cycle)

<table>
<tr><th colspan="3">Off season experiment on Macro cycle</th></tr>
<tr><th>Baseline</th><th>Training (Transitional / Offseason)</th><th>Post test</th></tr>
<tr><td>Day 1</td><td>45 days**</td><td>Day 1</td></tr>
<tr><td>Super compensation</td><td rowspan="3">Exp. Gr. (n1=15):
Lead up practice of Volleyball skills + Yoga.

Cont. Gr. (n2=15):
Lead up practice of Volleyball skills + Recreation.</td><td>Super compensation</td></tr>
<tr><td>Physical fitness</td><td>Physical fitness</td></tr>
<tr><td>Volleyball skills</td><td>Volleyball skills</td></tr>
<tr><td colspan="3">** Although the duration of macro cycle training seems to be longer than a micro cycle; however, considering the recent trend of tough competition,</td></tr>
</table>

the investigator intends to see if the short duration of transitional phase / offseason training phase in macro cycle especially with yoga training could be effective or not on the selected variables.

3.3 Variables and their measurement:

Based on literature, following variables will be selected for this experiment:

Sr. No.	Component	Test Name	Comments
SUPER COMPENSATION IN OFFSEASON			
1.	Super compensation state in periodization indicates a player's recovery	Needs graphical representation (%)	This is a state that appears during offseason of either micro or macro cycle of training / periodization. If the percentage of super-compensation is higher that slows down level of physical fitness and skills. Thus, less percentage of super compensation signifies a better state of physical fitness and skills.
PHYSICAL FITNESS IN OFFSEASON			
1.	Agility	Shuttle Run test (Sec.)	Agility is a very important component of fitness for volleyball. The test will be performed indoor on the same surface that the game is played on.
2.	Flexibility	Sit & Reach test (Cm.)	Flexibility facilitates to prevent injury and being able to move freely around the court.
3.	Strength & Power	Vertical Jump test (Cm.)	Explosive leg power is very important for vertical jumping and speed of movement around the court.
4.	Speed	Sprint time over 20 m test (Sec.)	Acceleration is very important in volleyball. Most running is conducted over a short distance.
5.	Muscular endurance (Abdomen)	Sit up (number)	Core stability and abdominal function is important in agility and balance, and in the controlling of movement and execution of

			skills.
6.	Body Fat	Body fat monitor (%)	Excess body fat affects the basketball player's ability to jump vertically, move freely around the court, and the extra weight increase early fatigue.
VOLLEYBALL SKILLS IN OFFSEASON			
1.	Overhead pass test	Passing ability by Overhead pass (points)	This skill is difficult to perform and also difficult for opponent to withstand.
2.	Forearm pass test	Passing ability by Forearm pass (points)	It is simple and cannot score higher. This skill is easy for opponent to withstand.
3.	Service receive test	Accuracy in service reception (points)	Receiving service with perfection may support the team to get points.
4.	Spiking & Blocking test	Accuracy in smash and block (points)	Spiking and blocking are important for both the teams. Intelligent spiking helps to get winning points.

3.4Ethical Consideration

Informed consent of all the participants prior to the experiment will be taken with standard format (as per the Declaration of Helsinki). Further, permission from the principal of the school will be taken before commencement of the experiment.

4.0 STATISTICAL TECHNIQUES TO BE USED

The data will be processed through descriptive statistics. Further, they will be analyzed through inferential statistics as follows:

- The percentage-wise data of super compensation phase, numerical data on physical fitness and point-wise data on volleyball skills during offseason will be analyzed through descriptive statistics.

- The data analysis of each experiment will be done separately considering inferential statistics:

    - For analysis of data on super compensation level, student-'t' test or Chi square test will be employed.

    - For analysis of physical fitness data, 2 x 2 x 6 Factorial ANOVA followed by Scheffe's post hoc test will be employed.

    - For analysis of data on volleyball skills, 2 x 2 x 4 Factorial ANOVA followed by Scheffe's post hoc test will be used.

- Further, as the variables are same for two interventions (two experiments), the combined data analysis of the selected variables will be done considering ANCOVA followed by Scheffe's post hoc test.

5.0 CHAPTERIZATION

While writing the report of the thesis, the researcher will present the overall content in the following chapters:

- **Preliminary pages**
- **Chapter – I:** Introduction.
- **Chapter – II:** Review of literature.
- **Chapter – III:** Methodology.
- **Chapter – IV:** Results and Discussion.
- **Chapter – V:** Summary and conclusion.
- **Bibliography**

6.0 FACILITIES REQUIRED

- **Instruments:** Available.
- **Financial resources:** Available.

- **Man Power:**
  Some technical experts required for training in volleyball and yoga will be made available. In addition, the some technical assistants as may be required for data collection will be arranged as per requirement.

7.0 PLAN FOR WORK SCHEDULE TO COMPLETE THE PROJECT

WORK TO BE DONE	TIME TO COMPLETE
Preparation of research plan	02 months
Detailed review works	04 months
Preparation for experiment	06 months
Conducting Experiment	09 months
Data analysis	04 months
Writing research report	04 months
Research publication of 2 papers in UGC journals	06 months
Thesis submission	01 month

8.0 Possible Outcomes / Contribution

Volleyball is popular among the world wide nations and is played in Olympic Games as a competitive sport. Like every sport, the volleyball players have to undergo with vigorous sport training to exhibit top performance. Considering the intensity of competition, the coaches plan the micro or macro cycle of training for their players. Generally, they (coaches) plan micro or macro cycle of training considering three phases viz., *Preparatory phase, Competition phase and Transitional phase (Offseason).* This investigation will suggest inclusion of yoga training especially in the training schedule (either micro or macro cycle) during the transitional phase / offseason. This experiment may contribute the effectiveness of inclusion of yoga training on physical fitness, skills and super compensation level of volleyball players exclusive during offseason.

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